



Reserve Price Formation MCP Simulations

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- None of the simulation results are intended to mimic actual market results as the processes used to clear the actual market differ from those of the simulation tool.
 - PROBE (Day-Ahead and Perfect Dispatch versions)
- The intent of all the simulations is to provide an estimate of the impact of the different market design changes, holding all other variables (i.e. participant behavior) constant.
- 20 days were excluded from the simulation for Day-Ahead and 3 for Real-Time due to critical tool errors or non-convergence in the simulation.
- The Base Case is running current reserve methodology through simulation, not what actually occurred.

Item	Description
Objective	Estimate the new Day-Ahead Market reserve market clearing prices after the implementation of the reserve price formation changes.
Method	For 8/1/2021 thru 7/31/2022, simulate the Synchronized Reserve (SR), Primary Reserve (PR) and Secondary Reserve (SecR) market clearing prices.
Assumptions	<ul style="list-style-type: none"> • Fast-start pricing logic was included for all simulation days. • Offers were set to \$0/MWh in the RPF case and non-zero in base case as bid. • In RPF case, the following MW values were used for the first step of the ORDC: <ul style="list-style-type: none"> • SR: 1,450 MW • PR: 2,175 MW • SecR: 3,000 MW • A subzone (MAD/BPD) was not modeled.



Day Ahead Hourly Data Summary

- All SecR MCP's solved to \$0/MWh in RPF case.
- Average SR MCP:

Case	Aug. 2021	Sept.	Oct.	Nov.	Dec.	Jan. 2022	Feb.	Mar.	Apr.	May	Jun.	Jul.
Base (DASR - 30 min.)	\$0.53	\$0.19	\$0.12	\$0.05	\$0.01	\$0.01	\$0.00 2	\$0.01	\$0.002	\$0.23	\$0.32	\$0.21
RPF (SR – 10 min.)	\$0.002	\$0	\$0.27	\$0.26	\$0.02	\$0.01	\$0	\$0.10	\$0.18	\$0.02	\$0.01	\$0
RPF (PR – 10 min.)	\$0.002	\$0	\$0	\$0.03	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Item	Description
Objective	Estimate the new Real-Time Market reserve market clearing prices after the implementation of the reserve price formation changes.
Method	For 8/1/2021 thru 7/31/2022, simulate the Synchronized Reserve (SR), Primary Reserve (PR) and Secondary Reserve (SecR) market clearing prices.
Assumptions	<ul style="list-style-type: none"> • Market Participant submitted Tier 2 offers were used for base case. • No Tier 1 biasing was included. • Fast-start pricing logic was included for all simulation days. • SR offers were set to \$0/MWh in RPF case, not the expected value of the penalty currently set to \$0.02/MWh. • A subzone (MAD/BPD) was not modeled. • In the RPF case, 3,000 MW was used for the first step of the SecR ORDC.



Real Time Data Summary

- All SecR MCP's solved to \$0/MWh in RPF case.
- Average SR MCP:

Case	Aug. 2021	Sept.	Oct.	Nov.	Dec.	Jan. 2022	Feb.	Mar.	Apr.	May	Jun.	Jul.
Base (SR)	\$3.24	\$0.83	\$2.70	\$2.55	\$0.59	\$0.92	\$0.37	\$0.63	\$2.75	\$1.60	\$1.76	\$2.70
RPF (SR)	\$4.42	\$0.34	\$1.41	\$1.32	\$0.35	\$0.43	\$0.06	\$0.34	\$2.26	\$0.81	\$1.43	\$2.13
Base (PR)	\$3.24	\$0.47	\$0.35	\$0.37	\$0	\$0	\$0	\$0	\$0	\$0.05	\$0.87	\$0
RPF (PR)	\$4.42	\$0.30	\$0.17	\$0.27	\$0	\$0	\$0	\$0	\$0.03	\$0.01	\$0.91	\$0

- In the Real-Time Market simulations, the Unit Commitment of almost all units was held fixed, except for the CT and diesel units, which were allowed to be committed and decommitted throughout the operating day.
- This was done to simulate the impact that IT-SCED would have on the real-time market outcomes by committing additional units throughout the operating day.

- The underlying data is posted along with this presentation with the meeting materials for stakeholder use.
- Base and Simulation Case MCP's by hour (DA) and half-hour (RT) are included for all reserve products.

Base Case							Reserve Price Formation Case						
YYYY	MM	DD	HH:MM	SR MCP (\$/MWh)	PR MCP (\$/MWh)		YYYY	MM	DD	HH:MM	SR MCP (\$/MWh)	PR MCP (\$/MWh)	Secondary Reserve MCP (\$/MWh)
2021	8	1	00:00	0	0		2021	8	1	00:00	0	0	0
2021	8	1	00:30	0	0		2021	8	1	00:30	0	0	0
2021	8	1	01:00	0	0		2021	8	1	01:00	0	0	0
2021	8	1	01:30	0	0		2021	8	1	01:30	0	0	0
2021	8	1	02:00	0	0		2021	8	1	02:00	0	0	0
2021	8	1	02:30	0	0		2021	8	1	02:30	0	0	0
2021	8	1	03:00	0	0		2021	8	1	03:00	0	0	0
2021	8	1	03:30	0	0		2021	8	1	03:30	0	0	0
2021	8	1	04:00	0	0		2021	8	1	04:00	0	0	0
2021	8	1	04:30	0	0		2021	8	1	04:30	0	0	0
2021	8	1	05:00	0	0		2021	8	1	05:00	0	0	0

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Reserve Price Formation MCP Simulations



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